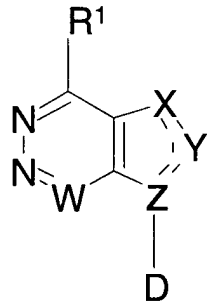
Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

These amendments introduce no new matter and support for the amendment is replete throughout the specification and claims as originally filed. These amendments are made without prejudice and are not to be construed as abandonment of the previously claimed subject matter, or agreement with any objection or rejection of record.

Listing of Claims:

1. (Cancelled) A nucleic acid binding compound comprising a backbone, said backbone having attached heterocyclic groups capable of base pairing to natural nucleobases at least one of said heterocyclic groups being one of the naturally occurring nucleobases characterized in that at least one other of said heterocyclic groups is a group of the general formula I

Formula I 

wherein

W is selected independently from X, Y and Z from the group consisting of N and CR^2,

Z is selected from the group consisting of N and C with the proviso that

- if Z is N, then

X independently from W and Y is selected from the group consisting of N and CR^3, and

Y independently from W and X is selected from the group consisting of N and CR^4,

and the bond between X and Y is a double bond and the bond between Y and Z is a single bond, and

- if Z is C, then

X is NR^{33}, and

Y is selected from the group consisting of N and CR^4 and

the bond between Z and Y is a double bond and the bond between X and Y is a single bond,

R^1, R^2, R^3 and R^4 are independently selected from the group consisting of -H, -halogen, $-OR^{13}$, $-SR^{19}$, $-(C_1-C_{10})$-alkyl, $-(C_2-C_{10})$-alkenyl, $-(C_2-C_{10})$-alkynyl, $-NO_2$, $-NR^5R^6$, -cyano, and $-C(=O)R^{11}$,

R^{11} is selected from the group consisting of -OH, $-(C_1-C_6)$-alkoxy, $-(C_6-C_{22})$-aryloxy, and NHR^{12},

R^5, R^6, R^{12}, R^{13}, R^{19} and R^{33} are selected independently from the group consisting of -H, $-(C_1-C_{10})$-alkyl, $-(C_2-C_{10})$-alkenyl, $-(C_2-C_{10})$-alkinyl, $-(C_6-C_{22})$-aryl, a protecting group and a reporter group,

r and s are independently of each other an integer of 1 to 18,

D is the position of attachment of the group to the rest of the nucleic acid binding compound, and

said alkyl, alkenyl and alkynyl being unsubstituted or substituted by one or more moieties selected from the group consisting of -halogen, -SH, -S-(C_1-C_6)-alkyl, -(C_1-C_6)-alkoxy, -OH, $-NR^5R^6$, $-COR^{11}$, $-NH-CONR^5R^6$, $-NH-CSNR^5R^6$ and $-[O-(CH_2)_r]_s-NR^5R^6$.

2. (Cancelled) The nucleic acid binding compound of claim 1, wherein the backbone comprises sugar and phosphate moieties.

3. (Cancelled) A nucleic acid binding compound of claim 2, wherein the sugar configuration is selected from the group consisting of the α-D-, ß-D-, α-L- and β-L-configurations.

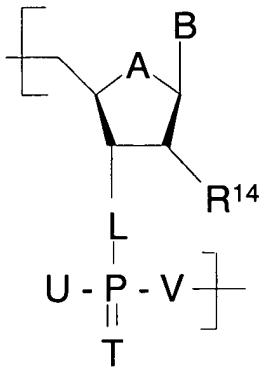
4. (Cancelled) The nucleic acid binding compound of claim 3, wherein the sugar moiety is a 2'-deoxy-β-D-erythropentofuranosyl moiety.

5. (Cancelled) The nucleic acid binding compound of claim 1, wherein R^1 is selected from the group consisting of -SH, -(C_1-C_6)-alkoxy, -(C_2-C_6)-alkylmercapto, -NR5R^6, F and NO_2.

6. (Cancelled) The nucleic acid compound of claim 5, wherein R^1 is $-NR^5R^6$.

7. (Cancelled) The nucleic acid binding compound of any of claims 1 - 6, wherein the backbone comprises one or more moieties of the general formula II

Formula II



wherein

A is selected from the group consisting of O, S and N-(C_1-C_{10})-alkyl,

L is selected from the group consisting of oxy, sulfanediyl and -NR^{22}-,

T is selected from the group consisting of oxo, thioxo and selenoxo,

U is selected from the group consisting of -OH, -O-reporter group, -SH, -S reporter group -SeH, -(C_1-C_{10})-alkoxy, (C_1-C_{10})-alkyl, -(C_6-C_{22})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -$NR^{23}R^{24}$, and -O-(C_1-C_{10})-alkyl-O-(C_1-C_{10})-alkyl-R^{25}, or wherein -$NR^{23}R^{24}$ can together with N be a 5-6-membered heterocyclic ring,

V is selected from the group consisting of oxy, sulfanediyl or -NR^{22}-,

R^{14} is selected from the group consisting of -H, -OH, -(C_1-C_{10})-alkoxy, -(C_2-C_{10})-alkenyloxy, -halogen, -azido, -O-allyl, -O-alkinyl, and -NH_2,

R^{22} is independently selected from the group of –H and -(C_1-C_{10})-alkyl,

R^{23} and R^{24} are independently selected from the group consisting of -(C_1-C_{10})-alkyl, -(C_1-C_{20})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -(C_1-C_6)-alkyl-$[NH(CH_2)_c]_d$-$NR^{26}R^{27}$ and a reporter group,

R^{25} is selected from the group consisting of -H, -OH, -halogen, -amino,
-(C_1-C_{18})-alkylamino, -COOH, -$CONH_2$ and -COO(C_1-C_4)-alkyl and a reporter group,

R^{26} and R^{27} are independently selected from the group consisting from -H,
-(C_1-C_6)-alkyl, and -(C_1-C_4)-alkoxy-(C_1-C_6)-alkyl and a reporter group,

c is an integer from 2 to 6,

d is an integer from 0 to 6, and

B is a moiety of formula I,

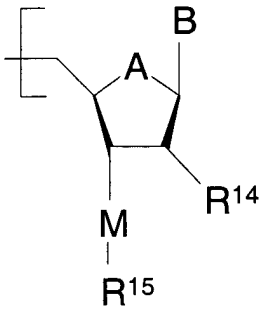
wherein any alkyl, alkenyl and alkynyl can be substituted or unsubstituted.

8. (Cancelled) The nucleic acid binding compound of claim 1, wherein R^1 is -NH_2.

9. (Cancelled) The nucleic acid compound of claim 1 containing at least one reporter group.

10. (Cancelled) The nucleic acid binding compound of claim 1, wherein the backbone comprises a moiety of the general formula III

Formula III



wherein

A is selected from the group consisting of O, S and N-(C_1-C_6)-alkyl,

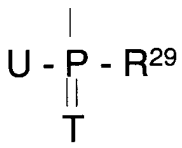
M is selected from the group consisting of oxy, sulfanediyl, -NR^{22}-, -(C_1-C_{10})-alkyl-, or -O-(C_1-C_{10})-alkyl-O-, and -S-(C_1-C_{10})-alkyl-O- and -NR^{22}-
(C_1-C_6)-alkyl-O-,

R^{22} is selected from the group of –H, -(C_1-C_{10})-alkyl, a protecting group and a reporter group,

R^{14} is selected from the group consisting of -H, -OH, -(C_1-C_{10})-alkoxy,
-(C_2-C_{10})-alkenyloxy, -(C_2-C_{10})-alkynyloxy, -halogen, -azido, SH, -(C_1-C_{10})-alkylmercapto and -NH_2,

R^{15} is selected from the group consisting of -H, -(C_1-C_6)-alkyl, -(C_2-C_{10})-alkenyl, -(C_2-C_{10})-alkynyl, -(C_2-C_{10})-alkyl-carbonyl, -(C_3-C_{19})-alkenyl-carbonyl, -(C_3-C_{19})-alkynyl-carbonyl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, a solid phase and a group of formula IV

Formula IV



wherein

T is selected from the group consisting of oxo, thioxo and selenoxo, and

U is selected from the group consisting of -OH, -O-reporter group, -SH, -SeH, -(C_1-C_{10})-alkoxy, -(C_1-C_{10})-alkyl, -(C_6-C_{22})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -$NR^{23}R^{24}$, and -O-(C_1-C_{10})-alkyl-O-(C_1-C_{10})-alkyl-R^{25}, or wherein $NR^{23}R^{24}$ can together with N be a 5-6-membered heterocyclic ring,

R^{23} and R^{24} are independently selected from the group consisting of -(C_1-C_{10})-alkyl, -(C_1-C_{20})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -(C_1-C_6)-alkyl-$[NH(CH_2)_c]_d$-$NR^{26}R^{27}$,

R^{25} is selected from the group consisting of -H, -OH, -halogen, -amino,
-(C_1-C_{18})-alkylamino, -COOH, -$CONH_2$ and -$COO(C_1$-$C_4)$-alkyl,

R^{26} and R^{27} are independently selected from the group consisting from -H,
-(C_1-C_6)-alkyl, and -(C_1-C_4)-alkoxy-(C_1-C_6)-alkyl

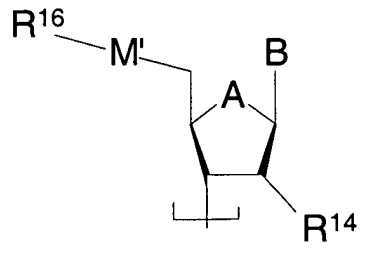
R^{29} is selected from the group consisting of -OR^{30} and -SR^{30},

R^{30} is selected from the group consisting of -H, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl, -(C_6-C_{22})-aryl, a protecting group, a solid phase and a reporter group

B is the link to a moiety of formula I,

wherein any alkyl, alkenyl and alkynyl can be substituted or unsubstituted.

11. (Cancelled) The nucleic acid binding compound of any of claims 1, 5 and 6, wherein said backbone comprises a moiety of the formula V

Formula V 

wherein

A is selected from the group consisting of O, S and N-(C_1-C_6)-alkyl,

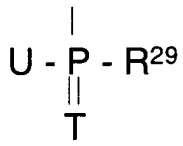
M' is selected from the group consisting of oxy, sulfanediyl, -NR^{22}-, -(C_1-C_{10})-alkyl, or -O-(C_1-C_{10})-alkyl-O-, and -S-(C_1-C_{10})-alkyl-O- and -NR^{22}-(C_1-C_6)-alkyl-O-,

R^{22} is selected from the group of -H, a protecting group, a reporter group and
-(C_1-C_{10})-alkyl,

R^{14} is selected from the group consisting of -H, -OH, -(C_1-C_{10})-alkoxy,
-(C_2-C_{10})-alkenyloxy, -(C_2-C_{10})-alkynyloxy, -halogen, azido, -SH, -S-(C_1-C_6)-alkylmercapto and NH_2,

R^{16} is selected from the group consisting of -H, -(C_1-C_8)-alkyl, -(C_2-C_{18})-alkenyl, -(C_2-C_{18})-alkynyl, -(C_2-C_{18})-alkyl-carbonyl, -(C_3-C_{19})-alkenyl-carbonyl, -(C_3-C_{19})-alkynyl-arbonyl, -(C_6-C_{14})-aryl-(C_1-C_8)-alkyl, a protective group or a compound of formula IV

Formula IV



wherein

T is selected from the group consisting of oxo, thioxo and selenoxo,

U is selected from the group consisting of -OH, -SH, -SeH, -(C_1-C_{10})-alkoxy,
-(C_1-C_{10})-alkyl, -(C_6-C_{22})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -$NR^{23}R^{24}$, and -O-(C_1-C_{10})-alkyl-O-(C_1-C_{10})-alkyl-R^{25}, wherein $NR^{23}R^{24}$ can together with N be a 5-6-membered heterocyclic ring,

R^{23} and R^{24} are independently selected from the group consisting of -(C_1-C_{10})-alkyl, -(C_1-C_{20})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -(C_1-C_6)-alkyl-$[NH(CH_2)_c]_d$-$NR^{26}R^{27}$,

R^{25} is selected from the group consisting of -H, -OH, -halogen, -amino,
-(C_1-C_{18})-alkylamino, -COOH, -$CONH_2$ and -$COO(C_1$-$C_4)$-alkyl,

R^{26} and R^{27} are independently selected from the group consisting from -H,
-(C_1-C_6)-alkyl, and -(C_1-C_4)-alkoxy-(C_1-C_6)-alkyl

R^{29} is selected from the group consisting of -OR^{30} and -SR^{30},

R^{30} is selected from the group consisting of -H, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl, -(C_6-C_{22})-aryl, a protecting group, a solid phase and a reporter group, and

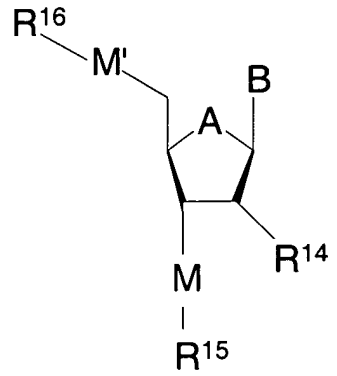
B is the link to a moiety of formula I,

wherein any alkyl, alkenyl and alkynyl can be substituted or unsubstituted.

12. (Cancelled) The compound of claim 11, wherein M' is O, R^{16} is H and R^{14} is selected from the group consisting of -H and -OH.

13. (Cancelled) A compound of formula VI

Formula VI



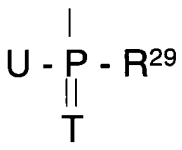
wherein

A is selected from the group consisting of O, S and N-(C_1-C_6)-alkyl,

R^{14} is selected from the group consisting of -H, -OH, -(C_1-C_{10})-alkoxy, O-protecting group, S-protecting group, NH-protecting group, -(C_2-C_{10})-alkenyloxy, -halogen, -azido, -SH, -(C_1-C_6)-alkylmercapto and -NH_2,

R^{15} and R^{16} are independently selected from the group consisting of -H, -(C_1-C_8)-alkyl, -(C_2-C_{18})-alkenyl, -(C_2-C_{18})-alkynyl, -(C_2-C_{18})-alkyl-carbonyl,
-(C_3-C_{19})-alkenyl-carbonyl, -(C_3-C_{19})-alkynyl-carbonyl, -(C_6-C_{14})-aryl-(C_1-C_8)-alkyl, a protecting group or a compound of formula IV

Formula IV



wherein

T is selected from the group consisting of oxo, thioxo and selenoxo,

U is selected from the group consisting of -OH, -SH, -SeH, -(C_1-C_{10})-alkoxy, -(C_1-C_{10})-alkyl, -(C_6-C_{22})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -$NR^{23}R^{24}$, and -O-(C_1-C_{10})-alkyl-O-(C_1-C_{10})-alkyl-R^{25}, or wherein $NR^{23}R^{24}$ can together with N be a 5-6-membered heterocyclic ring,

R^{23} and R^{24} are independently selected from the group consisting of -(C_1-C_{10})-alkyl, -(C_1-C_{20})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -(C_1-C_6)-alkyl-$[NH(CH_2)_C]_d$-$NR^{26}R^{27}$,

$R^{25}$is selected from the group consisting of -H, -OH, -halogen, amino, -(C_1-C_{18})-alkylamino, -COOH, -$CONH_2$ and $COO(C_1$-$C_4)$-alkyl,

R^{26} and R^{27} are independently selected from the group consisting from -H, -(C_1-C_6)-alkyl, and -(C_1-C_4)-alkoxy-(C_1-C_6)-alkyl,

R^{29} is selected from the group consisting of -OR^{30} and -SR^{30},

R^{30} is selected from the group consisting of -H, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl, -(C_6-C_{22})-aryl, a protecting group, a diphosphate and a reporter group, and

M and M' are independently selected from the group consisting of oxy, sulfanediyl, -NR^{22}, -(C_1-C_{10})-alkyl, or -O-(C_1-C_{10})-alkyl-O-, and -S-(C_1-C_{10})-alkyl-O- and -NR^{22}-(C_1-C_6)-alkyl-O-,

R^{22} is selected from the group of -H and -(C_1-C_{10})-alkyl, and

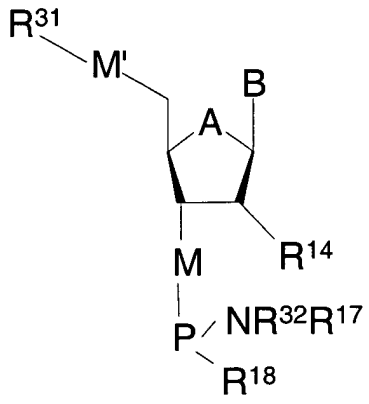
B is a moiety of formula I,

wherein any alkyl, alkenyl and alkynyl can be substituted or unsubstituted, and wherein at least one of R^{15} and R^{16} is not a group of formula IV with the proviso that MR^{16}, MR^{15} and R^{14} are not each -OH if R^1 is -NH_2 and if either

- W and X and Y and Z is N, or
- W and X and Z is N and Y is CR^4, or
- W and Y and Z is N and X is CR^3.

14. (Cancelled) A compound of formula VII

Formula VII



wherein

A is selected from the group consisting of O, S and N-(C_1-C_6)-alkyl,

M and M' are independently selected from the group consisting of oxy, sulfanediyl, -NR^{22}, -(C_1-C_{10})-alkyl, or -O-(C_1-C_{10})-alkyl-O-, and -S-(C_1-C_{10})-alkyl-O- and -NR^{22}-(C_1-C_6)-alkyl-O-,

R^{22} is selected from the group of -H and -(C_1-C_{10})-alkyl,

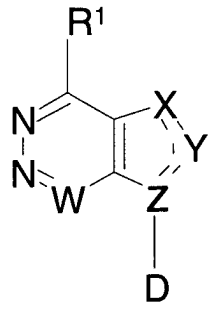
R^{14} is selected from the group consisting of -H, -OR^{31}, -(C_1-C_{10})-alkoxy, -(C_2-C_{10})-alkenyloxy, -(C_2-C_{10})-alkynyloxy, -halogen, -azido NHR^{31}, SR^{31} and -NH_2,

R^{31} is a protecting group or a reporter group,

R^{32} and R^{17} are independently selected from the group consisting of -H, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl and -(C_6-C_{22})-aryl,

R^{18} is selected from the group consisting of substituted or unsubstituted -(C_1-C_6)-alkyl, unsubstituted -(C_1-C_6)-alkoxy or -(C_1-C_6)-alkoxy substituted one or more times by a group selected from the group consisting of -halogen, p-nitroaryloxy and -cyano, and

B is a group of formula I

Formula I 

wherein

W is selected independently from X, Y and Z from the group consisting of N and CR^2,

Z is selected from the group consisting of N and C with the proviso that

- if Z is N, then

X independently from W and Y is selected from the group consisting of N and CR^3, and

Y independently from W and X is selected from the group consisting of N and CR^4,

and the bond between X and Y is a double bond and the bond between Y and Z is a single bond, and

- if Z is C, then

X is NR^{33}, and

Y is selected from the group consisting of N and CR^4 and

the bond between Z and Y is a double bond and the bond between X and Y is a single bond,

R^1, R^2, R^3 and R^4 are independently selected from the group consisting of -H, -halogen, $-OR^{13}$, $-SR^{19}$, $-(C_1-C_{10})$-alkyl, $-(C_2-C_{10})$-alkenyl, $-(C_2-C_{10})$-alkynyl, $-NO_2$, $-NR^5R^6$, -cyano, and $-C(=O)R^{11}$,

R^{11} is selected from the group consisting of -OH, -(C_1-C_6)-alkoxy, -(C_6-C_{22})-aryloxy, and NHR^{12},

R^5, R^6, R^{12}, R^{13}, R^{19} and R^{33} are selected independently from the group consisting of -H, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl, -(C_2-C_{10})-alkinyl, -(C_6-C_{22})-aryl, a protecting group and a reporter group,

r and s are independently of each other an integer of 1 to 18,

D is the position of attachment of the group to the rest of the nucleic acid binding compound, and

alkyl, alkenyl and alkynyl being unsubstituted or substituted by one or more moieties selected from the group consisting of -halogen, -S-(C_1-C_6)-alkyl, -(C_1-C_6)-alkoxy, $-NR^5R^6$, $-CO-R^{11}$, $-NH-CO-NR^5R^6$, $-NH-CSNR^5R^6$ and $-[O-(CH_2)_r]_s-NR^5R^6$,

with the proviso that at least one of R^5 and R^6 of $-NR^5R^6$ is a protecting group.

15. (Cancelled) A compound of claim 14, wherein R^1 is not OR^{31}.

16. (Cancelled) A compound of claim 14, wherein said group of formula I contains at least one reporter group.

17. (Cancelled) A compound of any of claims 14 and 15, wherein said group of formula I is selected from the group consisting of groups of formula I, wherein either

- W is N, Z is N, Y is N and X is CR^3, or
- W is N, Z is C, Y is N and X is CR^3, or
- W is N, Z is N, Y is N and X is N.

18. (Cancelled) A compound of claim 5 with the proviso that R^{31} is not H.

19. (Cancelled) The binding product of at least one nucleic acid binding compound of any of claims 1 to 11 and a nucleic acid, the nucleic acid binding compound and the nucleic acid being bound to each other by base pairing in parallel or antiparallel orientation.

20. (Cancelled) A method for the determination of a nucleic acid comprising the steps

- providing a sample suspected to contain said nucleic acid,
- providing a nucleic acid binding compound of claim 1, which is essentially complementary to a part or all of said nucleic acid,
- contacting said sample with said nucleic acid binding compound under conditions for binding said nucleic acid binding compound to said nucleic acid,
- determining the binding product formed from said nucleic acid and said nucleic acid binding compound as a measure of the presence of said nucleic acid.

21. (Cancelled) A method of claim 20, wherein any groups of formula I in said nucleic acid binding compound of claim 1 is located in said compound as to base pair to a G moiety in said nucleic acid.

22. (Cancelled) Use of a 2-azapurine in a nucleic acid binding compound as a substitute for cytosine.

23. (Cancelled) The use of a 2-azapurine in hybridization reactions of probes with nucleic acids as a base at a position of the probe base pairing with G in the nucleic acid.

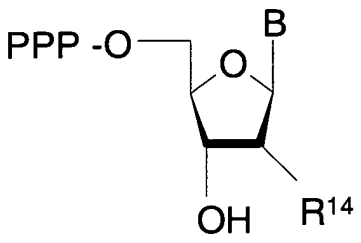
24. (Cancelled) A method for the chemical synthesis of a compound of any of claims 1 to 13 using activated subunits, wherein said subunit contains at least one group of formula I.

25. (Cancelled) A method of claim 24, wherein at least one subunit is a compound of any of claims 13 to 21.

26. (Cancelled) A method for the enzymatic synthesis of a compound of any of claims 1 to 13, comprising reacting a triphosphate subunit with a primer using a nucleic acid as a template for the elongation of the primer, wherein the triphosphate subunit contains a heterocyclic group of formula I.

27. (Cancelled) A method according to claim 26, wherein said triphosphate subunit has the formula VIII

Formula VIII



wherein

PPP is a triphosphate group,

R^{14} is selected from the group consisting of -H, -OH, -(C_1-C_{10})-alkoxy, -(C_2-C_{10})-alkenyloxy, -(C_2-C_{10})-alkynyloxy halogen, -azido and NH_2, and

B is a group of formula I,

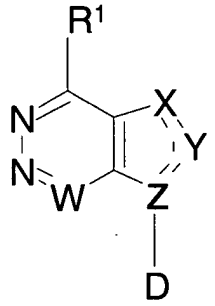
with the proviso that R^{14} is not OH if B is 2-azaadenine.

28. (Currently amended) A method for the determination of the presence or absence of nucleic acids each comprising a particular sequence in a sample comprising the steps

- contacting said sample with a solid phase having immobilized on its surface nucleic acid binding compounds each containing a sequence complementary to one of said particular sequences of said nucleic acids,
- determining on said solid phase the formation of hybrids containing a nucleic acid with a particular sequence and the nucleic acid binding compound containing the complementary sequence,

characterized in that said at least one of said nucleic acid binding compounds comprises: a backbone, comprising one or more attached heterocyclic groups capable of base pairing to natural nucleobases, with at least one of the heterocyclic groups being one of the naturally occurring nucleobases, and characterized in that at least one other of the heterocyclic groups comprises a group of the general formula I:

Formula I



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wherein:

W is selected independently from X, Y and Z from the group consisting of N and CR^2;

Z is selected from the group consisting of N and C with the proviso that

- if Z is N, then

X independently from W and Y is selected from the group consisting of N and CR^3, and

Y independently from W and X is selected from the group consisting of N and CR^4,

and the bond between X and Y is a double bond and the bond between Y and Z is a single bond, and

- if Z is C, then

  X is NR^{33}, and

  Y is selected from the group consisting of N and CR^4 and

  the bond between Z and Y is a double bond and the bond between X and Y is a single bond;

R^1, R^2, R^3 and R^4 are independently selected from the group consisting of -H, -halogen, $-OR^{13}$, $-SR^{19}$, $-(C_1-C_{10})$-alkyl, $-(C_2-C_{10})$-alkenyl, $-(C_2-C_{10})$-alkynyl, $-NO_2$, $-NR^5R^6$, -cyano, and $-C(=O)R^{11}$;

R^{11} is selected from the group consisting of -OH, $-(C_1-C_6)$-alkoxy, $-(C_6-C_{22})$-aryloxy, and NHR^{12};

R^5, R^6, R^{12}, R^{13}, R^{19} and R^{33} are selected independently from the group consisting of -H, $-(C_1-C_{10})$-alkyl, $-(C_2-C_{10})$-alkenyl, $-(C_2-C_{10})$-alkynyl, $-(C_6-C_{22})$-aryl, a protecting group and a reporter group;

D is the position of attachment of the group to the rest of the nucleic acid binding compound; and,

the alkyl, alkenyl and alkynyl being unsubstituted or substituted by one or more moieties selected from the group consisting of -halogen, -SH, $-S-(C_1-C_6)$-alkyl, $-(C_1-C_6)$-alkoxy, -OH, $-NR^5R^6$, $-COR^{11}$, $-NH-CONR^5R^6$, $-NH-CSNR^5R^6$ and $-[O-(CH_2)_r]_s-NR^5R^6$ with r and s are independently of each other an integer of 1 to 18.

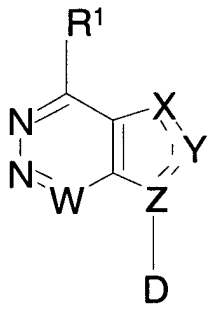
29. (Currently amended) A method for the determination of the presence, absence or amount of a nucleic acid in a sample comprising the steps:

- providing primers, a first primer being essentially complementary to a first binding sequence of said nucleic acid, and the second primer being essentially complementary to a binding sequence of a complement of this nucleic acid, and a probe being complementary to the nucleic acid or the complement thereof between the binding sequences of said primers, said probe being labelled at different subunits by at least two different reporter groups,

- subjecting the sample with said primers and said probe under conditions favouring extenstion of said primers and separating said reporter groups from each other by enzymatically disintegrating the probe, and

- determining the extent of disintegration of the probe via at least one of said reporter groups,

characterized in that at least one of said primer or probe comprises a nucleic acid binding compound comprising a backbone, comprising one or more attached heterocyclic groups capable of base pairing to natural nucleobases, with at least one of the heterocyclic groups being one of the naturally occurring nucleobases, and characterized in that at least one other of the heterocyclic groups comprises a group of the general formula I,

Formula I 

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wherein:

W is selected independently from X, Y and Z from the group consisting of N and CR^2;

Z is selected from the group consisting of N and C with the proviso that

- if Z is N, then

  X independently from W and Y is selected from the group consisting of N and CR^3, and

  Y independently from W and X is selected from the group consisting of N and CR^4,

  and the bond between X and Y is a double bond and the bond between Y and Z is a single bond, and

- if Z is C, then

  X is NR^{33}, and

Y is selected from the group consisting of N and CR^4 and

the bond between Z and Y is a double bond and the bond between X and Y is a single bond;

R^1, R^2, R^3 and R^4 are independently selected from the group consisting of -H, -halogen, $-OR^{13}$, $-SR^{19}$, $-(C_1-C_{10})$-alkyl, $-(C_2-C_{10})$-alkenyl, $-(C_2-C_{10})$-alkynyl, $-NO_2$, $-NR^5R^6$, -cyano, and $-C(=O)R^{11}$;

R^{11} is selected from the group consisting of -OH, $-(C_1-C_6)$-alkoxy, $-(C_6-C_{22})$-aryloxy, and NHR^{12};

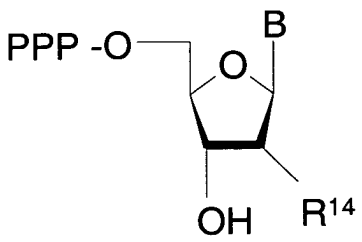
R^5, R^6, R^{12}, R^{13}, R^{19} and R^{33} are selected independently from the group consisting of -H, $-(C_1-C_{10})$-alkyl, $-(C_2-C_{10})$-alkenyl, $-(C_2-C_{10})$-alkynyl, $-(C_6-C_{22})$-aryl, a protecting group and a reporter group;

D is the position of attachment of the group to the rest of the nucleic acid binding compound; and,

the alkyl, alkenyl and alkynyl being unsubstituted or substituted by one or more moieties selected from the group consisting of -halogen, -SH, $-S-(C_1-C_6)$-alkyl, $-(C_1-C_6)$-alkoxy, -OH, $-NR^5R^6$, $-COR^{11}$, $-NH-CONR^5R^6$, $-NH-CSNR^5R^6$ and $-[O-(CH_2)_r]_s-NR^5R^6$ with r and s are independently of each other an integer of 1 to 18.

30. (Cancelled) A compound of the general formula VIII

Formula VIII



wherein

PPP is a triphosphate group,

R^{14} is selected from the group consisting of -H, -OH, -(C_1-C_{10})-alkoxy, -(C_2-C_{10})-alkenyloxy, -(C_2-C_{10})-alkynyloxy halogen, -azido and NH_2, and

B is a group of formula I,

with the proviso that R^{14} is not OH if B is 2-azaadenine.

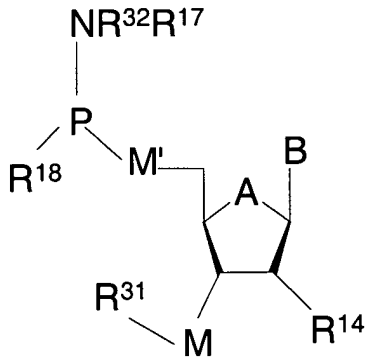
31. (Cancelled) A compound of claim 30, wherein -M-R^{16} is a triphosphate group and -M-R^{15} is -OH.

32. (Cancelled) A compound of claim 31, wherein R^{14} is -OH.

33. (Cancelled) A compound of claim 30, wherein R^{14} is -H and R^1 is not OH.

34. (Cancelled) A compound of general formula IX

Formula IX



wherein

A is selected from the group consisting of O, S and N-(C_1-C_6)-alkyl,

M and M' are independently selected from the group consisting of oxy, sulfanediyl, -NR^{22}, -(C_1-C_{10})-alkyl, or -O-(C_1-C_{10})-alkyl-O-, and -S-(C_1-C_{10})-alkyl-O- and -NR^{22}-(C_1-C_6)-alkyl-O-,

R^{22} is selected from the group of -H and -(C_1-C_{10})-alkyl,

R^{14} is selected from the group consisting of -H, -OR^{31}, -(C_1-C_{10})-alkoxy, -(C_2-C_{10})-alkenyloxy, -(C_2-C_{10})-alkynyloxy, -halogen, -azido NHR^{31}, SR^{31} and -NH_2,

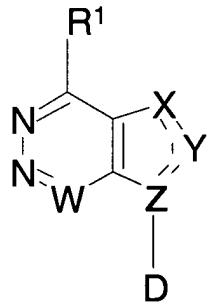
R^{31} is a protecting group or a reporter group,

R^{32} and R^{17} are independently selected from the group consisting of -H, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl and -(C_6-C_{22})-aryl,

R^{18} is selected from the group consisting of substituted or unsubstituted -(C_1-C_6)-alkyl, unsubstituted -(C_1-C_6)-alkoxy or -(C_1-C_6)-alkoxy substituted one or more times by a group selected from the group consisting of -halogen, p-nitroaryloxy and -cyano, and

B is a group of formula I

Formula I



wherein

W is selected independently from X, Y and Z from the group consisting of N and CR^2,

Z is selected from the group consisting of N and C with the proviso that

- if Z is N, then

X independently from W and Y is selected from the group consisting of N and CR^3, and

Y independently from W and X is selected from the group consisting of N and CR^4,

and the bond between X and Y is a double bond and the bond between Y and Z is a single bond, and

- if Z is C, then

X is NR^{33}, and

Y is selected from the group consisting of N and CR^4 and

the bond between Z and Y is a double bond and the bond between X and Y is a single bond,

R^1, R^2, R^3 and R^4 are independently selected from the group consisting of -H, -halogen, $-OR^{13}$, $-SR^{19}$, $-(C_1-C_{10})$-alkyl, $-(C_2-C_{10})$-alkenyl, $-(C_2-C_{10})$-alkynyl, $-NO_2$, $-NR^5R^6$, -cyano, and $-C(=O)R^{11}$,

R^{11} is selected from the group consisting of -OH, $-(C_1-C_6)$-alkoxy, $-(C_6-C_{22})$-aryloxy, and NHR^{12},

R^5, R^6, R^{12}, R^{13}, R^{19} and R^{33} are selected independently from the group consisting of -H, $-(C_1-C_{10})$-alkyl, $-(C_2-C_{10})$-alkenyl, $-(C_2-C_{10})$-alkinyl, $-(C_6-C_{22})$-aryl, a protecting group and a reporter group,

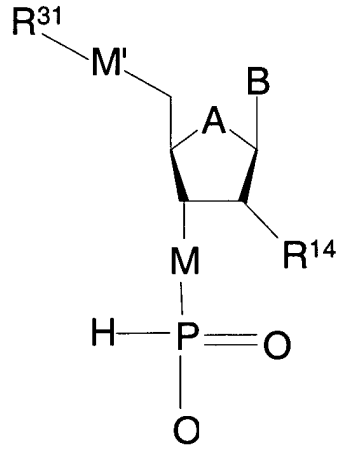
r and s are independently of each other an integer of 1 to 18,

D is the position of attachment of the group to the rest of the nucleic acid binding compound, and

alkyl, alkenyl and alkynyl being unsubstituted or substituted by one or more moieties selected from the group consisting of -halogen, $-S-(C_1-C_6)$-alkyl, $-(C_1-C_6)$-alkoxy, $-NR^5R^6$, $-CO-R^{11}$, $-NH-CO-NR^5R^6$, $-NH-CSNR^5R^6$- and $-[O-(CH_2)_r]_s-NR^5R^6$, with the proviso that at least one of R^5 and R^6 of $-NR^5R^6$ is a protecting group.

35. (Cancelled) A compound of general formula X

Formula X



wherein

M and M' are independently selected from the group consisting of oxy, sulfanediyl, -NR^{22}, -(C_1-C_{10})-alkyl, or -O-(C_1-C_{10})-alkyl-O-, and -S-(C_1-C_{10})-alkyl-O- and -NR^{22}-(C_1-C_6)-alkyl-O-,

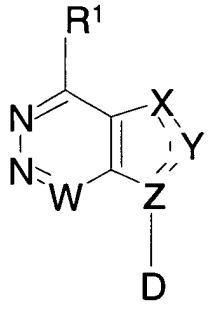
R^{22} is selected from the group of -H and -(C_1-C_{10})-alkyl,

R^{14} is selected from the group consisting of -H, -OR^{31}, -(C_1-C_{10})-alkoxy,

-(C_2-C_{10})-alkenyloxy, -(C_2-C_{10})-alkynyloxy, -halogen, -azido NHR^{31}, SR^{31} and -NH_2,

R^{31} is a protecting group or a reporter group,

B is a group of formula I

Formula I 

wherein

W is selected independently from X, Y and Z from the group consisting of N and CR^2,

Z is selected from the group consisting of N and C with the proviso that

- if Z is N, then

X independently from W and Y is selected from the group consisting of N and CR^3, and

Y independently from W and X is selected from the group consisting of N and CR^4,

and the bond between X and Y is a double bond and the bond between Y and Z is a single bond, and

- if Z is C, then

X is NR^{33}, and

Y is selected from the group consisting of N and CR^4 and

the bond between Z and Y is a double bond and the bond between X and Y is a single bond,

R^1, R^2, R^3 and R^4 are independently selected from the group consisting of -H, -halogen, -OR^{13}, -SR^{19}, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl, -(C_2-C_{10})-alkynyl, -NO_2, -NR^5R^6, -cyano, and -C(=O)R^{11},

R^{11} is selected from the group consisting of -OH, -(C_1-C_6)-alkoxy, -(C_6-C_{22})-aryloxy, and NHR^{12},

R^5, R^6, R^{12}, R^{13}, R^{19} and R^{33} are selected independently from the group consisting of -H, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl, -(C_2-C_{10})-alkinyl, -(C_6-C_{22})-aryl, a protecting group and a reporter group,

r and s are independently of each other an integer of 1 to 18,

D is the position of attachment of the group to the rest of the nucleic acid binding compound, and

alkyl, alkenyl and alkynyl being unsubstituted or substituted by one or more moieties selected from the group consisting of -halogen, -S-(C_1-C_6)-alkyl, -(C_1-C_6)-alkoxy, -NR^5R^6, -CO-R^{11}, -NH-CO-NR^5R^6, -NH-CSNR^5R^6- and -[O-(CH_2)$_r$]$_s$-NR^5R^6.

36. (Previously presented) The method of claim **28** or claim **29**, wherein the backbone comprises sugar and phosphate moieties.

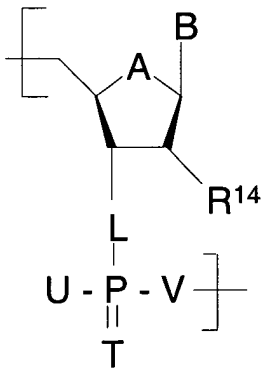
37. (Previously presented) The method of claim **36**, wherein the sugar comprises a configuration selected from the group consisting of: the α-D-, ß-D-, α-L-, and β-L-configurations.

38. (Previously presented) The method of claim **37**, wherein the sugar comprises a 2'-deoxy-β-D-erythropentofuranosyl moiety.

39. (Previously presented) The method of claim **28** or claim **29**, wherein R^1 is selected from the group consisting of: -SH, -(C_1-C_6)-alkoxy, -(C_2-C_6)-alkylmercapto, -NR^5R^6, F and NO_2.

40. (Previously presented) The method of claim **28** or claim **29**, wherein the backbone further comprises one or more moieties of the general formula II:

Formula II



wherein:

A is selected from the group consisting of O, S and N-(C_1-C_{10})-alkyl;

L is selected from the group consisting of oxy, sulfanediyl and -NR^{22}-;

T is selected from the group consisting of oxo, thioxo and selenoxo;

U is selected from the group consisting of -OH, -O-reporter group, -SH, -S reporter group -SeH, -(C_1-C_{10})-alkoxy, (C_1-C_{10})-alkyl, -(C_6-C_{22})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -$NR^{23}R^{24}$, and -O-(C_1-C_{10})-alkyl-O-(C_1-C_{10})-alkyl-R^{25}, or wherein -$NR^{23}R^{24}$ can together with N be a 5-6-membered heterocyclic ring;

V is selected from the group consisting of oxy, sulfanediyl or -NR^{22}-;

R^{14} is selected from the group consisting of -H, -OH, -(C_1-C_{10})-alkoxy, -(C_2-C_{10})-alkenyloxy, -halogen, -azido, -O-allyl, -O-alkinyl, and -NH_2;

R^{22} is independently selected from the group of –H and -(C_1-C_{10})-alkyl;

R^{23} and R^{24} are independently selected from the group consisting of -(C_1-C_{10})-alkyl, -(C_1-C_{20})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -(C_1-C_6)-alkyl-[$NH(CH_2)_c$]$_d$-$NR^{26}R^{27}$ and a reporter group;

R^{25} is selected from the group consisting of -H, -OH, -halogen, -amino, -(C_1-C_{18})-alkylamino, -COOH, -$CONH_2$ and -$COO(C_1$-$C_4)$-alkyl and a reporter group;

R^{26} and R^{27} are independently selected from the group consisting of -H, -(C_1-C_6)-alkyl, and -(C_1-C_4)-alkoxy-(C_1-C_6)-alkyl and a reporter group;

c is an integer from 2 to 6;

d is an integer from 0 to 6; and,

B is a moiety of formula I;

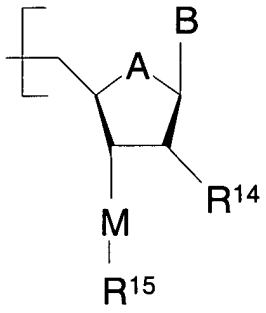
wherein any alkyl, alkenyl and alkynyl can be substituted or unsubstituted.

41. (Previously presented) The method of claim **28** or claim **29**, wherein, wherein R^1 is $-NH_2$.

42. (Previously presented) The method of claim **28** or claim **29**, wherein the compound comprises at least one reporter group.

43. (Previously presented) The method of claim **28** or claim **29**, wherein the backbone comprises a moiety of the general formula III

Formula III



wherein:

T is selected from the group consisting of oxo, thioxo and selenoxo;

U is selected from the group consisting of -OH, -O-reporter group, -SH, -SeH, -$(C_1$-$C_{10})$-alkoxy, -$(C_1$-$C_{10})$-alkyl, -$(C_6$-$C_{22})$-aryl, -$(C_6$-$C_{14})$-aryl-$(C_1$-$C_{10})$-alkyl, -$NR^{23}R^{24}$, and -O-$(C_1$-$C_{10})$-alkyl-O-$(C_1$-$C_{10})$-alkyl-R^{25}, or wherein $NR^{23}R^{24}$ can together with N be a 5-6-membered heterocyclic ring;

R^{23} and R^{24} are independently selected from the group consisting of -$(C_1$-$C_{10})$-alkyl, -$(C_1$-$C_{20})$-aryl, -$(C_6$-$C_{14})$-aryl-$(C_1$-$C_{10})$-alkyl, -$(C_1$-$C_6)$-alkyl-$[NH(CH_2)_c]_d$-$NR^{26}R^{27}$;

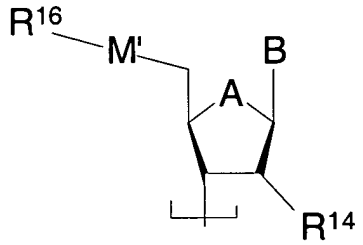
R^{25} is selected from the group consisting of -H, -OH, -halogen, -amino, -(C_1-C_{18})-alkylamino, -COOH, -$CONH_2$ and -COO(C_1-C_4)-alkyl;

R^{26} and R^{27} are independently selected from the group consisting from -H, -(C_1-C_6)-alkyl, and -(C_1-C_4)-alkoxy-(C_1-C_6)-alkyl; and,

B is the link to a moiety of formula I,

wherein any alkyl, alkenyl and alkynyl can be substituted or unsubstituted.

44. (Previously presented) The method of claim **28** or claim **29**, wherein the backbone comprises a moiety of the formula V

Formula V 

wherein:

A is selected from the group consisting of O, S and N-(C_1-C_6)-alkyl;

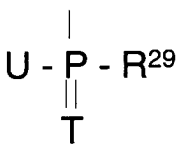
M' is selected from the group consisting of oxy, sulfanediyl, -NR^{22}-, -(C_1-C_{10})-alkyl, or -O-(C_1-C_{10})-alkyl-O-, and -S-(C_1-C_{10})-alkyl-O- and -NR^{22}-(C_1-C_6)-alkyl-O-,

R^{22} is selected from the group consisting of -H, a protecting group, a reporter group and -(C_1-C_{10})-alkyl ;

R^{14} is selected from the group consisting of -H, -OH, -(C_1-C_{10})-alkoxy, -(C_2-C_{10})-alkenyloxy, -(C_2-C_{10})-alkynyloxy, -halogen, azido, -SH, -S-(C_1-C_6)-alkylmercapto and NH_2;

R^{16} is selected from the group consisting of -H, -(C_1-C_8)-alkyl, -(C_2-C_{18})-alkenyl, -(C_2-C_{18})-alkynyl, -(C_2-C_{18})-alkyl-carbonyl, -(C_3-C_{19})-alkenyl-carbonyl, -(C_3-C_{19})-alkynyl-arbonyl, -(C_6-C_{14})-aryl-(C_1-C_8)-alkyl, a protective group or a compound of formula IV

Formula IV



wherein:

T is selected from the group consisting of oxo, thioxo and selenoxo;

U is selected from the group consisting of -OH, -SH, -SeH, -(C_1-C_{10})-alkoxy, -(C_1-C_{10})-alkyl, -(C_6-C_{22})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -$NR^{23}R^{24}$, and -O-(C_1-C_{10})-alkyl-O-(C_1-C_{10})-alkyl-R^{25}, wherein $NR^{23}R^{24}$ can together with N be a 5-6-membered heterocyclic ring;

R^{23} and R^{24} are independently selected from the group consisting of -(C_1-C_{10})-alkyl, -(C_1-C_{20})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, and -(C_1-C_6)-alkyl-$[NH(CH_2)_c]_d$-$NR^{26}R^{27}$;

R^{25} is selected from the group consisting of -H, -OH, -halogen, -amino, -(C_1-C_{18})-alkylamino, -COOH, -$CONH_2$ and -$COO(C_1$-$C_4)$-alkyl;

R^{26} and R^{27} are independently selected from the group consisting of -H, -(C_1-C_6)-alkyl, and -(C_1-C_4)-alkoxy-(C_1-C_6)-alkyl;

R^{29} is selected from the group consisting of -OR^{30} and -SR^{30};

R^{30} is selected from the group consisting of -H, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl, -(C_6-C_{22})-aryl, a protecting group, a solid phase and a reporter group; and,

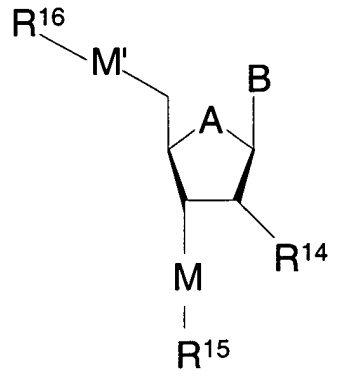
B is the link to a moiety of formula I;

wherein any alkyl, alkenyl and alkynyl can be substituted or unsubstituted.

45. (Previously presented) The method of claim **44**, wherein M' is O, R^{16} is H, and R^{14} is selected from the group consisting of -H and -OH.

46. (Previously presented) The method of claim **28** or claim **29**, wherein the compound comprises formula VI

Formula VI



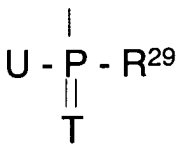
wherein:

A is selected from the group consisting of O, S and N-(C_1-C_6)-alkyl;

R^{14} is selected from the group consisting of -H, -OH, -(C_1-C_{10})-alkoxy, O-protecting group, S-protecting group, NH-protecting group, -(C_2-C_{10})-alkenyloxy, -halogen, -azido, -SH, -(C_1-C_6)-alkylmercapto and -NH_2;

R^{15} and R^{16} are independently selected from the group consisting of -H, -(C_1-C_8)-alkyl, -(C_2-C_{18})-alkenyl, -(C_2-C_{18})-alkynyl, -(C_2-C_{18})-alkyl-carbonyl, -(C_3-C_{19})-alkenyl-carbonyl, -(C_3-C_{19})-alkynyl-carbonyl, -(C_6-C_{14})-aryl-(C_1-C_8)-alkyl, a protecting group or a compound of formula IV

Formula IV



wherein:

T is selected from the group consisting of oxo, thioxo and selenoxo;

U is selected from the group consisting of -OH, -SH, -SeH, -(C_1-C_{10})-alkoxy, -(C_1-C_{10})-alkyl, -(C_6-C_{22})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -$NR^{23}R^{24}$, and -O-(C_1-C_{10})-alkyl-O-(C_1-C_{10})-alkyl-R^{25}, or wherein $NR^{23}R^{24}$ can together with N be a 5-6-membered heterocyclic ring;

R^{23} and R^{24} are independently selected from the group consisting of -(C_1-C_{10})-alkyl, -(C_1-C_{20})-aryl, -(C_6-C_{14})-aryl-(C_1-C_{10})-alkyl, -(C_1-C_6)-alkyl-[$NH(CH_2)_C$]$_d$-$NR^{26}R^{27}$;

$R^{25}$is selected from the group consisting of -H, -OH, -halogen, amino, -(C_1-C_{18})-alkylamino, -COOH, -$CONH_2$ and $COO(C_1$-$C_4)$-alkyl;

R^{26} and R^{27} are independently selected from the group consisting from -H, -(C_1-C_6)-alkyl, and -(C_1-C_4)-alkoxy-(C_1-C_6)-alkyl;

R^{29} is selected from the group consisting of -OR^{30} and -SR^{30};

R^{30} is selected from the group consisting of -H, -(C_1-C_{10})-alkyl, -(C_2-C_{10})-alkenyl, -(C_6-C_{22})-aryl, a protecting group, a diphosphate and a reporter group;

M and M' are independently selected from the group consisting of oxy, sulfanediyl, -NR^{22}, -(C_1-C_{10})-alkyl, -O-(C_1-C_{10})-alkyl-O-, and -S- (C_1-C_{10})-alkyl-O- and -NR^{22}-(C_1-C_6)-alkyl-O-;

R^{22} is selected from the group of -H and -(C_1-C_{10})-alkyl; and,

B is a moiety of formula I;

wherein any alkyl, alkenyl and alkynyl can be substituted or unsubstituted, and wherein at least one of R^{15} and R^{16} is not a group of formula IV with the proviso that MR^{16}, MR^{15} and R^{14} are not each -OH if R^1 is -NH_2 and if either

- W and X and Y and Z is N, or
- W and X and Z is N and Y is CR^4, or
- W and Y and Z is N and X is CR^3.